Surface Mount

Bandpass Filter

BPF-C587+

50Ω 470 to 705 MHz

Generic photo used for illustration purposes only

CASE STYLE: HU1186

The Big Deal

- Sharp roll-off
- Flatness 1.0 dB typical over the passband
- Wide bandwidth
- Good VSWR
- Miniature shielded package

Product Overview

The BPF-C587+ is a wide band filter in a small shielded package (size of 0.87" x 0.80" x 0.25") fabricated using SMT technology. This filter offers sharp roll-off and rejection of 25 dB Typ. for use in HDTV broadcasting.

Key Features

Feature	Advantages
Sharp roll-off	Provides good rejection of signals close to passband for improved systems performance.
Good VSWR	This filter maintains typical VSWR over passband frequency range making this filter easier to integrate into receiver and transmitter RF chains with less concerns for in band frequency ripple.
Flatness 1.0 dB typical	Better flatness over the full HDTV broadcasting band (420-705 MHz) making this ideal for use in applications where flatness and repeatability are critical performance requirements.
Metal SMT Shielded case.	Reduced interference to, and from surrounding components.

Surface Mount

Bandpass Filter

50Ω 470 to 705 MHz

BPF-C587+

Generic photo used for illustration purposes only

CASE STYLE: HU1186

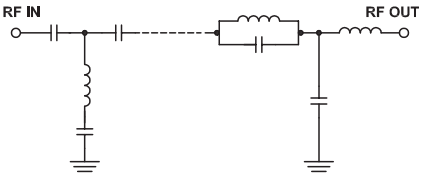
Features

- Sharp roll-off
- Wide bandwidth
- Good VSWR
- Miniature shielded package

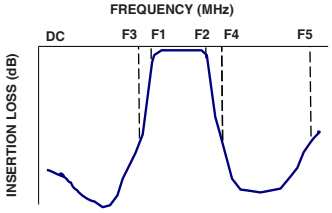
Applications

- Harmonic rejection
- TV Broadcasting / HDTV
- Transmitters / Receivers

Functional Schematic



Typical Frequency Response



+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications at 25°C

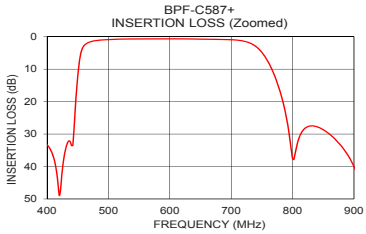
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	587	—	MHz
	Insertion Loss	F1-F2	470-705	—	2.0	2.5	dB
	Flatness	F1-F2	470-705	—	1.0	1.5	dB
	VSWR	F1-F2	470-705	—	1.7	1.9	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-400	25	30	—	dB
	VSWR	DC-F3	DC-400	—	20	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	800-1500	20	25	—	dB
	VSWR	F4-F5	800-1500	—	20	—	:1

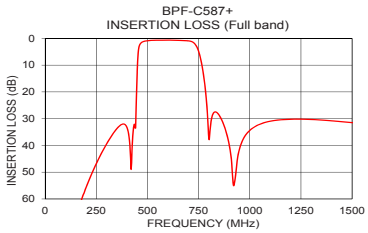
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1 W

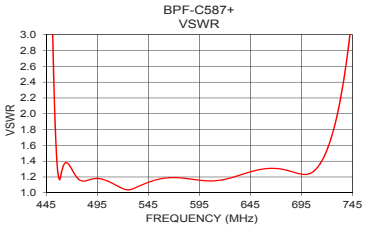
Permanent damage may occur if any of these limits are exceeded.

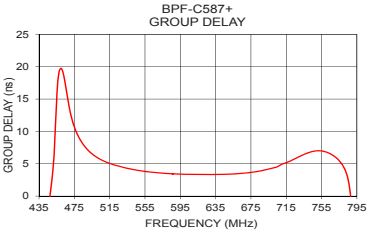
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	102.01	352.40	470	13.22
50	83.87	442.67	480	9.11
200	55.72	190.60	490	7.17
400	33.32	37.80	500	6.03
446	22.17	7.15	510	5.32
448	16.82	5.41	520	4.83
450	12.33	3.84	530	4.45
458	3.43	1.16	540	4.16
470	1.61	1.30	550	3.92
587	0.67	1.17	587	3.44
705	0.99	1.25	600	3.38
720	1.34	1.54	620	3.34
740	2.99	2.74	640	3.35
760	7.69	5.64	650	3.39
784	19.87	9.56	660	3.46
794	29.43	10.86	670	3.58
800	37.59	11.63	680	3.76
1000	34.39	29.94	690	4.01
1250	30.20	36.43	700	4.34
1500	31.49	32.24	705	4.55









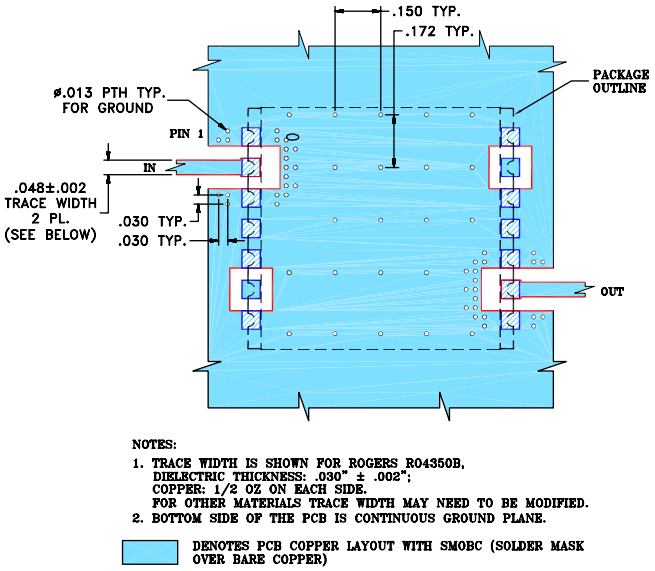
Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

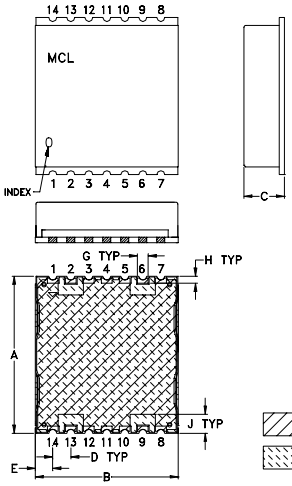
Pad Connections

INPUT	2
OUTPUT	9
GROUND	1,3,4,5,7,8,10,11,12,14
NOT CONNECTED	6,13

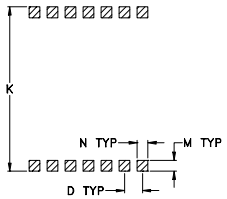
Demo Board MCL P/N: TB-500+
Suggested PCB Layout (PL-294)



Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
.870	.800	.25	.100	.097	--	.060	.040
22.10	20.32	6.35	2.54	2.46	--	1.52	1.02

J	K	L	M	N	P	wt
.105	.910	--	.060	.060	--	grams
2.67	23.11	--	1.52	1.52	--	2.85

Note: Please refer to case style drawing for details

Surface Mount Band Pass Filter BPF-C587+

Typical Performance Data

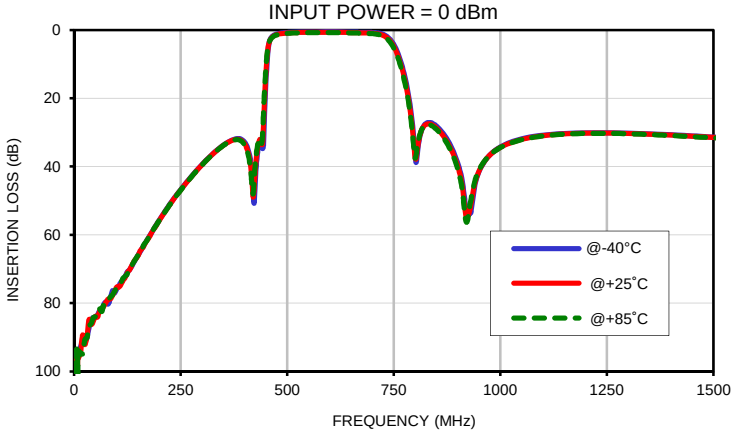
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1.0	98.13	102.01	97.70	0.05	0.05	0.05	0.05	0.05	0.05
10.0	94.16	96.04	94.11	0.04	0.04	0.04	0.05	0.05	0.05
20.0	91.14	89.33	94.84	0.04	0.04	0.04	0.04	0.05	0.05
30.0	90.33	90.03	90.12	0.04	0.04	0.04	0.04	0.05	0.05
40.0	84.95	86.30	85.95	0.03	0.04	0.04	0.04	0.05	0.05
50.0	84.25	83.87	83.99	0.03	0.04	0.04	0.05	0.06	0.06
60.0	82.28	82.30	81.70	0.03	0.04	0.04	0.05	0.07	0.07
75.0	79.64	79.71	80.06	0.03	0.04	0.04	0.07	0.08	0.09
100.0	75.86	75.28	75.52	0.03	0.04	0.04	0.09	0.12	0.12
120.0	72.04	72.45	72.14	0.03	0.05	0.05	0.13	0.16	0.17
140.0	68.03	67.83	67.91	0.03	0.06	0.06	0.17	0.21	0.23
160.0	63.93	63.96	63.82	0.04	0.06	0.07	0.22	0.27	0.29
200.0	55.61	55.72	55.74	0.06	0.09	0.10	0.31	0.36	0.38
220.0	51.82	51.98	52.04	0.07	0.10	0.12	0.33	0.40	0.42
240.0	48.35	48.46	48.52	0.08	0.12	0.14	0.35	0.41	0.44
250.0	46.69	46.83	46.88	0.09	0.13	0.15	0.35	0.41	0.44
260.0	45.11	45.24	45.33	0.10	0.14	0.16	0.35	0.42	0.44
280.0	42.14	42.25	42.32	0.12	0.17	0.18	0.34	0.41	0.44
300.0	39.41	39.49	39.54	0.14	0.19	0.21	0.32	0.39	0.43
320.0	36.92	36.97	37.02	0.17	0.22	0.24	0.30	0.38	0.41
340.0	34.68	34.74	34.79	0.19	0.25	0.28	0.28	0.36	0.40
360.0	32.87	32.95	33.01	0.23	0.30	0.33	0.28	0.35	0.40
380.0	31.83	32.00	32.11	0.28	0.36	0.40	0.28	0.36	0.41
400.0	32.83	33.32	33.65	0.35	0.46	0.51	0.32	0.42	0.48
420.0	46.69	48.94	47.97	0.49	0.65	0.73	0.45	0.58	0.68
450.0	15.16	12.33	10.74	2.90	4.62	6.22	2.15	3.12	3.90
458.0	3.43	3.43	3.43	17.95	22.38	20.93	9.70	10.95	11.50
470.0	1.40	1.61	1.72	16.76	17.74	18.54	18.21	19.84	20.99
587.0	0.53	0.67	0.75	21.48	21.98	22.89	20.15	20.28	20.85
705.0	0.77	0.99	1.13	19.80	18.95	18.09	23.79	23.37	22.53
720.0	1.05	1.34	1.55	14.13	13.43	12.73	15.81	15.07	14.28
740.0	2.50	2.99	3.36	6.82	6.64	6.43	6.88	6.58	6.30
760.0	6.91	7.69	8.27	2.92	3.12	3.22	2.38	2.39	2.37
784.0	18.66	19.87	20.82	1.51	1.82	2.02	0.74	0.86	0.92
790.0	23.51	24.96	26.10	1.37	1.69	1.88	0.61	0.73	0.80
800.0	36.77	37.59	37.55	1.20	1.50	1.68	0.50	0.62	0.68
820.0	28.08	28.25	28.35	0.95	1.20	1.34	0.37	0.48	0.54
840.0	27.29	27.77	28.12	0.77	0.99	1.11	0.30	0.40	0.46
860.0	29.39	30.00	30.45	0.65	0.85	0.95	0.25	0.34	0.39
900.0	39.02	39.99	40.81	0.53	0.70	0.78	0.17	0.26	0.30
920.0	52.54	54.81	56.26	0.50	0.66	0.74	0.14	0.23	0.27
940.0	45.43	44.82	44.30	0.48	0.63	0.71	0.13	0.21	0.26
960.0	39.05	38.96	38.88	0.47	0.61	0.68	0.11	0.20	0.24
980.0	36.03	36.09	36.10	0.46	0.60	0.66	0.10	0.18	0.22
1000.0	34.25	34.39	34.44	0.45	0.58	0.65	0.09	0.17	0.21
1050.0	31.87	32.05	32.13	0.43	0.55	0.62	0.07	0.15	0.19
1060.0	31.59	31.77	31.84	0.42	0.55	0.61	0.07	0.15	0.19
1090.0	30.95	31.11	31.20	0.41	0.53	0.60	0.06	0.14	0.17
1100.0	30.79	30.96	31.04	0.40	0.53	0.60	0.05	0.13	0.17
1120.0	30.54	30.70	30.77	0.39	0.52	0.59	0.05	0.13	0.17
1140.0	30.37	30.51	30.58	0.39	0.52	0.59	0.05	0.13	0.17
1150.0	30.32	30.45	30.52	0.38	0.52	0.58	0.05	0.13	0.17
1200.0	30.13	30.22	30.29	0.34	0.49	0.56	0.04	0.12	0.16
1250.0	30.13	30.20	30.28	0.32	0.48	0.56	0.04	0.12	0.16
1300.0	30.24	30.32	30.40	0.30	0.48	0.57	0.04	0.12	0.16
1320.0	30.30	30.38	30.47	0.29	0.47	0.57	0.04	0.12	0.16
1350.0	30.43	30.52	30.61	0.29	0.48	0.58	0.04	0.12	0.16
1400.0	30.69	30.81	30.91	0.28	0.49	0.61	0.04	0.12	0.15
1450.0	31.00	31.14	31.25	0.28	0.51	0.64	0.04	0.12	0.16
1500.0	31.35	31.49	31.60	0.30	0.54	0.68	0.04	0.13	0.16

Typical Performance Data

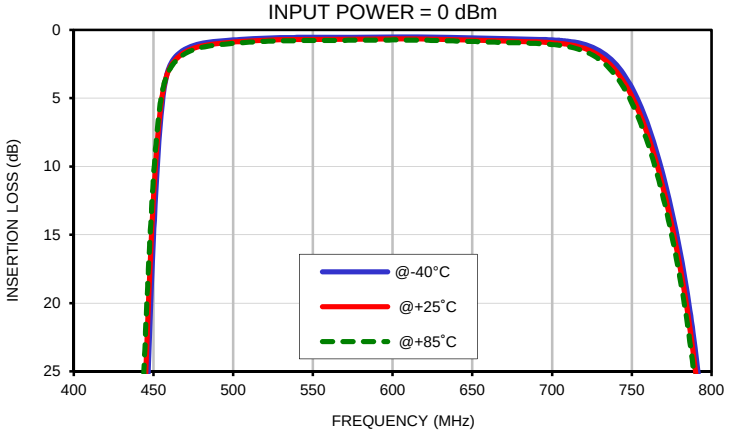
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
470	14.42	13.22	12.52
474	11.80	11.09	10.66
478	10.14	9.67	9.37
482	8.98	8.63	8.41
486	8.09	7.82	7.65
490	7.38	7.17	7.03
494	6.81	6.65	6.54
498	6.36	6.22	6.14
502	5.98	5.87	5.80
506	5.67	5.57	5.51
510	5.41	5.32	5.27
514	5.18	5.11	5.06
518	4.98	4.92	4.88
522	4.81	4.75	4.71
526	4.65	4.60	4.56
530	4.50	4.45	4.42
534	4.37	4.33	4.30
538	4.25	4.21	4.18
542	4.14	4.10	4.08
546	4.04	4.00	3.98
550	3.95	3.92	3.90
554	3.87	3.84	3.82
558	3.79	3.77	3.75
562	3.72	3.70	3.69
566	3.67	3.64	3.64
570	3.62	3.60	3.59
574	3.57	3.55	3.55
578	3.53	3.51	3.51
582	3.49	3.48	3.48
586	3.46	3.45	3.45
587	3.45	3.44	3.44
594	3.41	3.40	3.41
598	3.39	3.38	3.39
602	3.37	3.37	3.38
606	3.36	3.36	3.36
610	3.35	3.35	3.36
614	3.34	3.34	3.35
618	3.34	3.34	3.35
622	3.34	3.34	3.34
626	3.34	3.34	3.35
630	3.34	3.34	3.35
634	3.34	3.34	3.35
638	3.35	3.35	3.36
642	3.35	3.36	3.37
646	3.37	3.37	3.38
650	3.39	3.39	3.40
654	3.41	3.41	3.43
658	3.44	3.44	3.46
662	3.47	3.48	3.50
666	3.51	3.53	3.55
670	3.56	3.58	3.60
674	3.62	3.64	3.67
678	3.69	3.71	3.75
682	3.77	3.80	3.84
686	3.86	3.90	3.94
690	3.96	4.01	4.06
694	4.09	4.14	4.19
698	4.22	4.28	4.33
702	4.35	4.41	4.47
705	4.48	4.55	4.61

Typical Performance Curves

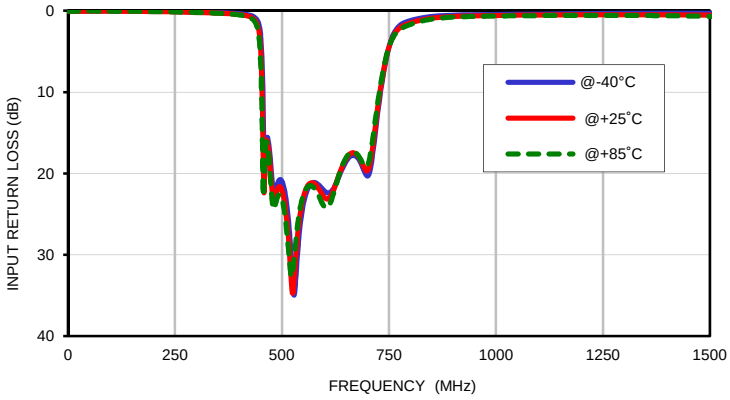
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



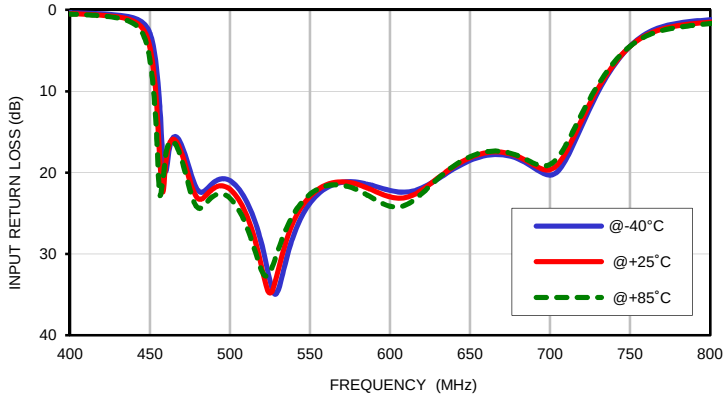
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



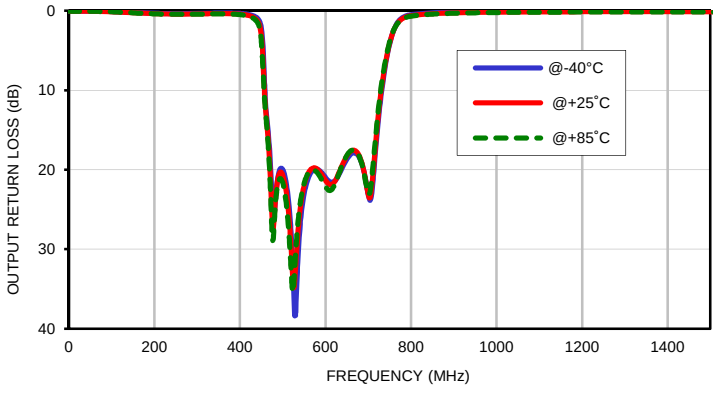
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



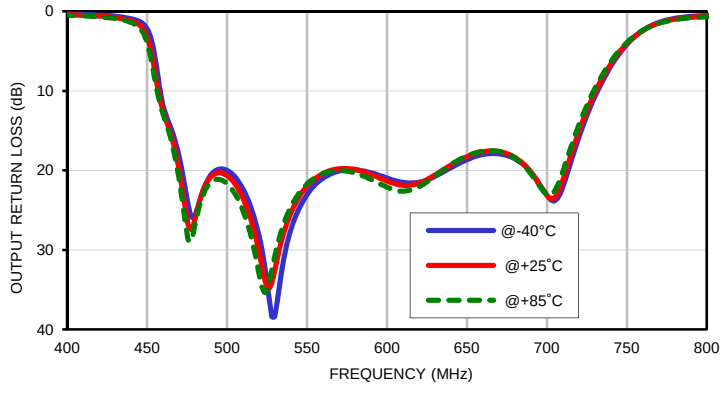
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



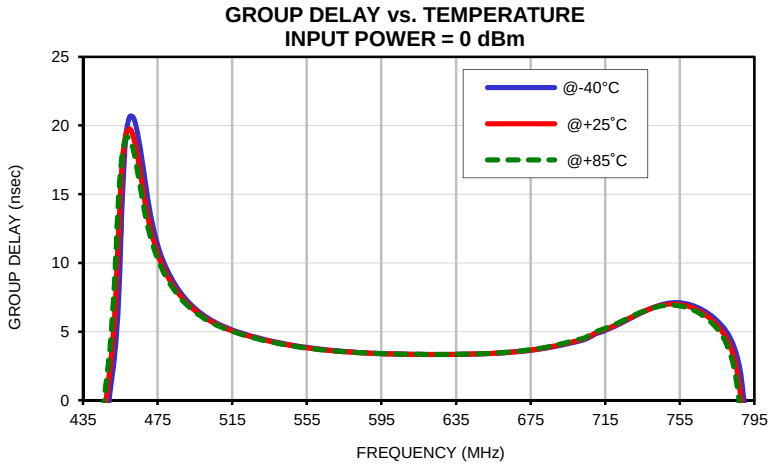
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



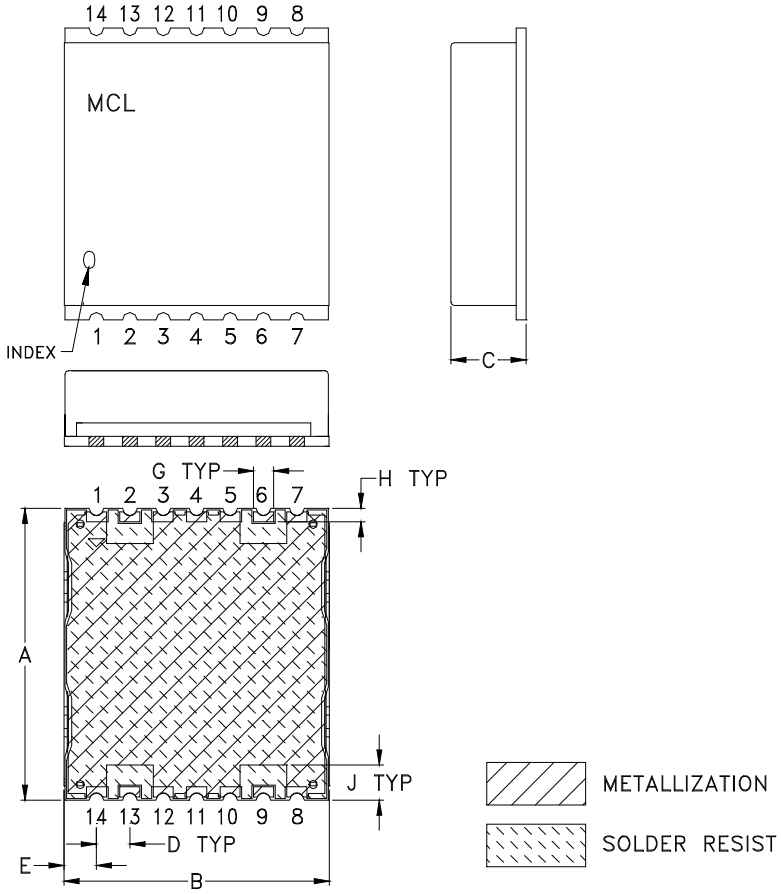
Typical Performance Curves



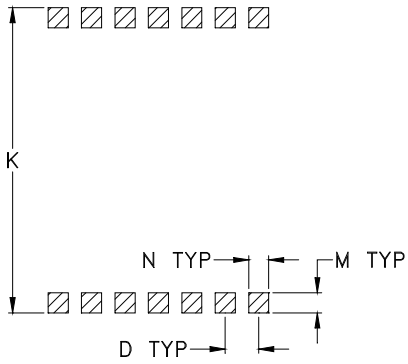
Case Style HU

Outline Dimensions

HU1186



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT, GRAM
HU1186	.870 (22.10)	.800 (20.32)	.25 (6.35)	.100 (2.54)	.097 (2.46)	- -	.060 (1.52)	.040 (1.02)	.105 (2.67)	.910 (23.11)	- -	.060 (1.52)	.060 (1.52)	- -	2.85

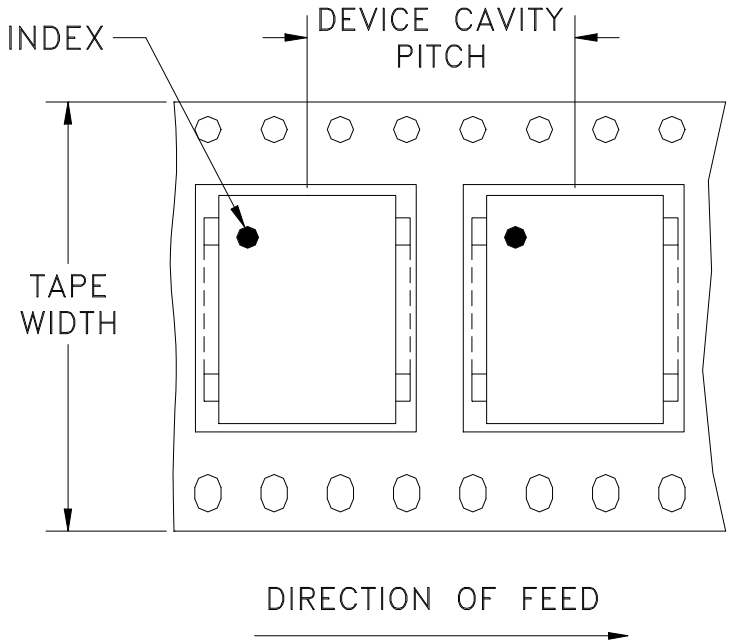
Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

Tape & Reel Packaging TR-F21

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	32	13	200

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

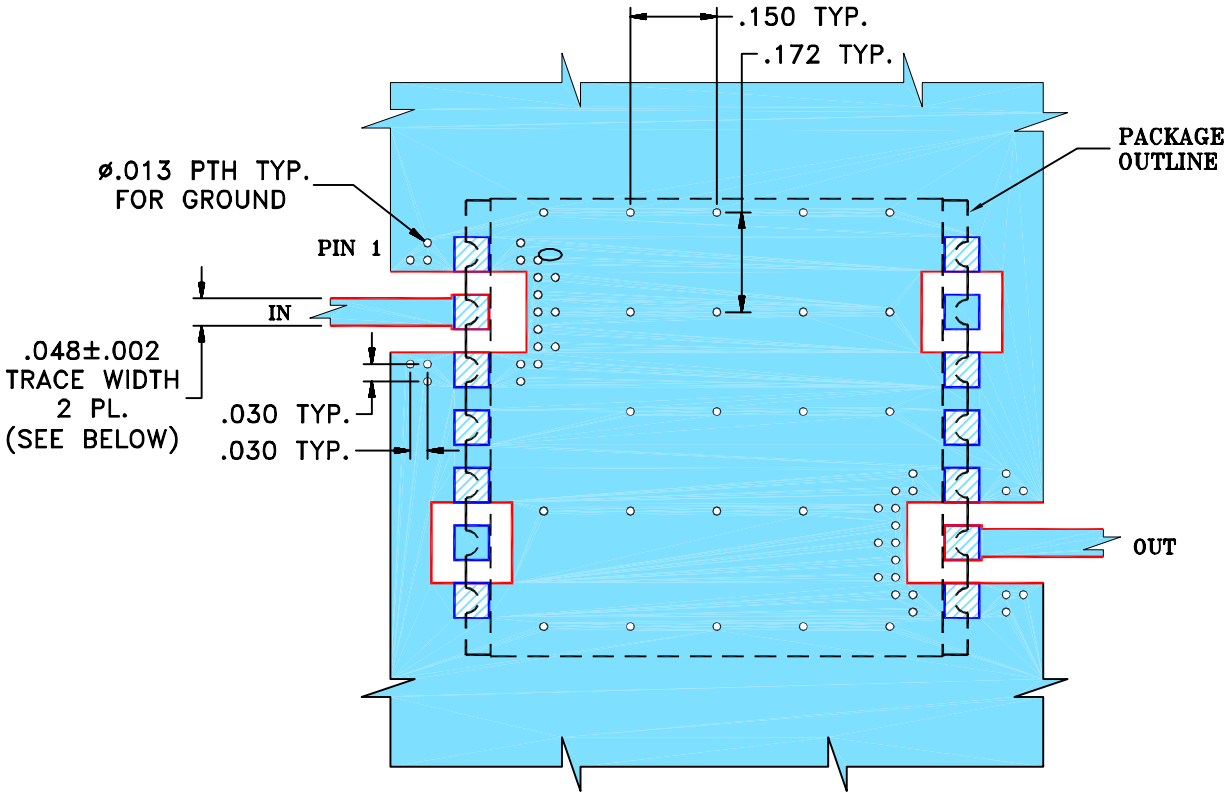
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M119979	NEW RELEASE (FROM RAVON)	11/08	DK	HH
OR	R74463	NEW RELEASE (FROM RAVON)	11/08	DK	HH

SUGGESTED MOUNTING CONFIGURATION FOR HU1186 CASE STYLE, "14FL03" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS: .030" ± .002"; COPPER: 1/2 OZ ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DK (RAVON)	02 NOV 08
TOLERANCES ON:	CHECKED	DH (RAVON)	02 NOV 08
2 PL DECIMALS ±	APPROVED	HH (RAVON)	02 NOV 08
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

ASHEETA1.DWG REV:A DATE:01/12/95

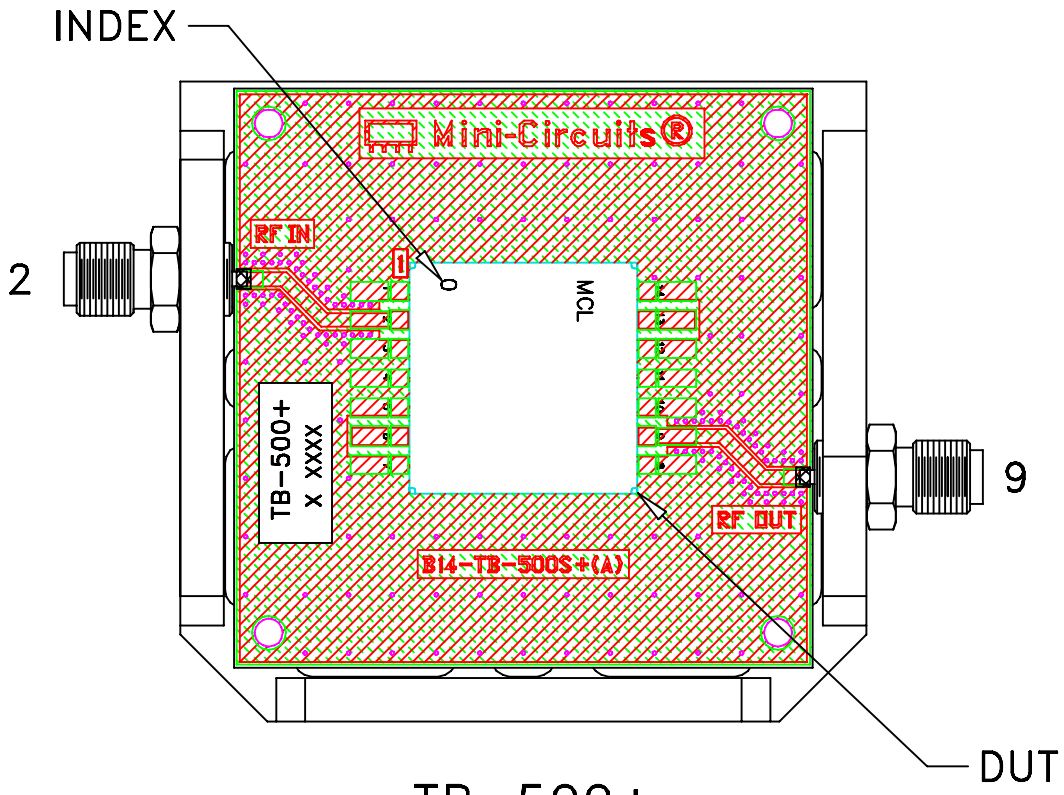
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 14FL03, HU1186, BPF-C
TB-500+ (50 OHM)

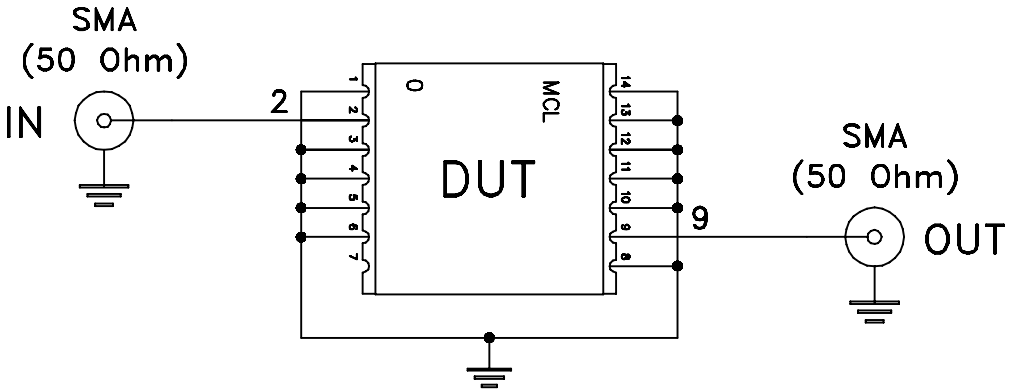
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-294	OR

FILE:	SCALE:	SHEET:
98PL294	3:1	1 OF 1

Evaluation Board and Circuit



TB-500+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent.
   Dielectric Constant=3.5, Thickness=.030 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV54

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A